

Docket No. ATOTP0100US

Serial No. 09/981,587

**REMARKS**

Claims 1-25 are pending in the present application. Applicant and Applicant's undersigned attorney wish to thank the Examiner for the careful and thorough attention given to this application. Applicant acknowledges with gratitude the withdrawal of the finality of the previous Office Action.

Applicant respectfully requests reconsideration of the rejections set forth in the Office Action mailed 02 January 2003. Applicant submits that the presently claimed invention patentably distinguishes over the prior art, and in particular distinguishes over the asserted combination of Stevenson and Izaki et al. set forth in the Office Action to which this paper is responsive.

**Rejections Based on Stevenson in view of Izaki et al.**

Claims 1-6 and 10-24 stand rejected as obvious over Stevenson, U.S. Patent No. 4,552,626, in view of Izaki et al., U.S. Patent No. 6,406,750 B1. Claims 7-8 stand rejected as obvious over Stevenson in view of Izaki et al. and further in view of Pendleton, U.S. Patent No. 5,110,355. Claim 9 stands rejected as obvious over Stevenson in view of Izaki et al. and further in view of Stamp et al., U.S. Patent No. 5,421,989. Applicant respectfully traverses the claim rejections for at least the following reasons.

Stevenson discloses a method of forming a conductive metal layer on a non-conductive substrate by a method similar to Applicant's method, except that Stevenson clearly prefers and only enables use of palladium as the catalyzing material. Applicant acknowledges that Stevenson, in passing, mentions using an acid bath of silver nitrate, at col. 7, lines 15-16.

Applicant submits that Stevenson's acid bath of silver nitrate, to the extent it is fairly disclosed in Stevenson, is distinct from Applicant's disclosed and claimed aqueous solution or mixture containing a silver salt having a pH in the range from about 5 to about 10.

Applicant has specifically distinguished acid baths such as Stevenson's in the specification, in the paragraph bridging from page 12 to page 13. Specifically, after stating

Docket No. ATOTP0100US

Serial No. 09/981,587

that silver ion had been generally eschewed in the prior art as a catalyst, Applicant stated, from page 12, line 26 to page 13, line 15:

In the prior art, when silver was used in such catalyzing applications, the silver ion was present in an acidic medium. The present inventor has discovered that when silver ion is present in a solution having a pH in the range from about 5 to about 10, excellent catalysis for electroless plating is obtained. In one embodiment, the solution has a pH in the range from about 6 to about 9. The present inventor has discovered that, the pH should not be acidic, e.g., below about pH 5, and the pH should not be increased to such a level that the silver becomes photosensitive, e.g., above about pH 10. Thus, an alkaline silver solution at a pH above about pH 10 would be unsatisfactory.

Thus, in accordance with a particular feature of the present invention, the catalyzing solution is substantially neutral pH, i.e., it has a pH in the range from about 5 to about 10, or a pH in the range from about 6 to about 9, or a pH in the range from about 6.5 to about 8.5, or a pH of about 7 to about 8, or a pH of about 6.5. A solution of silver nitrate in water, in the absence of other additives, has a pH of about 6.5. In one embodiment, the silver ion is present in a solution consisting essentially of deionized water and having a pH of about 6.5. These pH values, in the range from pH 5 to about pH 10, are defined herein as substantially neutral. (Emphasis added.)

In the first paragraph quoted above, the references to prior art acidic silver solutions was directed to solutions such as that of Stevenson. The second paragraph quoted above defines Applicant's catalyzing solutions as substantially neutral, i.e., not acidic, and having a pH range from about 5 to about 10. As shown by the foregoing, Applicant has defined the catalyzing solution recited in the claims in a way which fully distinguishes over Stevenson's solutions.

Furthermore, Stevenson's acidic solutions, exemplified by the Shipley Catalyst 9F in Table IV and in Examples I, II, III and IV, are highly acidic, having a pH about 2. On information and belief, the Shipley Catalyst 9F is disclosed in U.S. Patent No. 3,011,920 (copy submitted herewith), assigned to Shipley Co. (Applicant notes that Shipley Catalyst

Docket No. ATOTP0100US

Serial No. 09/981,587

9F is no longer commercially available, and only limited information relating to this material is now available. Applicant's undersigned attorney located Shipley's U.S. Patent No. 3,011,920 during a search of the patent literature, which revealed that the Shipley Catalyst 9F is described in this patent.) The sensitizer solutions disclosed in the Shipley patent include a solution including 600 ml of water and 300 ml of concentrated hydrochloric acid, together with Sn and Pd. This is a solution which is about 1/3 concentrated HCl. The pH of this solution is less than zero. As is well known in the chemical arts, pH is the negative log of the  $H^+$  ion concentration. Thus, for example, 0.01 M HCl has a pH of 2, 0.1 M HCl has a pH of 1, and 1.0 M HCl has a pH of 0. Concentrated HCl is approximately 11.6 M, and would have a pH of about -1. A solution containing 300 ml conc. HCl + 600 ml water ( $0.33 \times 11.6 \text{ M} = 3.83 \text{ M}$ ) would have a pH less than zero.

Referring to Example I of Stevenson, the electroless plating sensitizer used therein is prepared by diluting 9 grams of Shipley Catalyst 9F to one liter of water. This constitutes a dilution of about 9/1000 of the 3.83 M concentrated Catalyst 9F, yielding a solution having a concentration of HCl  $\approx 0.034 \text{ M}$ . This is the "acid bath" of Stevenson. The pH of this acid bath is very low, about 2, very far below the claimed range of pH 5-10 (claim 1) and even further below the claimed range of 6-9 (claims 14 and 21). Thus, while Stevenson refers to an acid bath, and a broad definition of "acid" may go as high as pH 7, in the present case, the facts do not support such a broad reading of Stevenson. Based on the examples of Stevenson, the acid bath of Stevenson clearly cannot be reasonably read to encompass a pH as high as the claimed ranges. Conversely, the substantially neutral aqueous solution recited in Applicant's claims can not be read so broadly as to encompass the "acid bath" of Stevenson.

Further evidence of the acidity of the Stevenson acid bath is provided by the attached article, "Through-Hole and Edge Plating of RT/duroid® Microwave Laminates", a paper found by Applicant on the website of Rogers Corporation, Chandler, AZ. A copy of this article is attached with this Reply. As indicated in paragraph 11 on page 3 of this article, the acidic Catalyst® 9F, which had "shown tendency to attack the black copper oxide bonding surface", has been replaced. If the acidic Catalyst® 9F had sufficiently

Docket No. ATOTP0100US

Serial No. 09/981,587

strong acidity to attack black copper oxide, it must have had a very low pH, substantially lower than the claimed ranges.

While Applicant acknowledges that the Stevenson examples referred to above relate to the acidic bath of palladium chloride (Stevenson's preferred embodiment), the "acid bath" of silver nitrate must be similar to the "acid bath" of palladium chloride, as exemplified by the Shipley Catalyst 9F. Given the very limited, passing mention of silver in Stevenson, it is not reasonable to give a broader reading to the Stevenson disclosure. Thus, Applicant submits that Stevenson's "acid bath of silver nitrate", like the acid bath of palladium chloride, must have a pH substantially lower than the presently claimed ranges.

There is no suggestion, and there is no motivation, in Stevenson for changing from the disclosed acid bath to a bath having a substantially neutral pH, such as that claimed by Applicant. Stevenson discloses only an acid bath, as described above.

In order to overcome this deficiency in the disclosure of Stevenson, the Examiner asserted that Izaki et al., which discloses a silver nitrate solution having a pH in the range from 5 to 11, could be combined with Stevenson such that the solution of Izaki et al. could be substituted for the acid bath of silver nitrate of Stevenson, thus rendering obvious Applicant's claimed invention. Applicant asserts that such a combination is improper, and cannot provide the basis for a legally proper assertion of *prima facie* obviousness, for the following reasons.

It is correct that Izaki et al. discloses such a bath. However, Izaki et al. also requires that this bath be used with a second activator containing palladium ions. There is no disclosure and there is no suggestion in Izaki et al. that the silver bath would be useful as an activator standing alone, and there is no suggestion in Izaki et al. that this substantially neutral pH silver bath could be selected and used as a substitute for the highly acidic bath of Stevenson. In this regard, the Examiner is referred to Applicant's previous Replies to the Office Action, wherein it was shown that Izaki et al. requires the use of palladium.

Thus, it is not proper to select and extract the very different silver nitrate solution from Izaki et al. for use in replacing Stevenson's highly acidic bath of silver nitrate, as posited by the Examiner in support of the rejection of Applicant's claims over the

Docket No. ATOTP0100US

Serial No. 09/981,587

combination of these references. Such a rejection fails the legal test for stating a *prima facie* case of obviousness. Specifically, there is no motivation for, and there is no basis for a reasonable expectation of success in making such a combination. Furthermore, since the Izaki et al. reference requires the use of palladium, the asserted combination would not meet all the limitations of Applicant's claims, which specifically exclude palladium.

Finally, while it is entirely proper for Applicant's claims to be given their broadest reasonable reading during prosecution, it is not proper to give the prior art the broadest possible reading. The prior art teaches, and can be used for, only what a person of skill in the art would understand from the disclosure of the art, taken as a whole. Any person of skill in the art would understand that Stevenson's "acid bath" is a highly acidic solution, and would not expect that such an acidic bath could be replaced by a bath having a pH within the scope of Applicant's claimed pH ranges.

For the foregoing reasons, Applicant respectfully submits that the presently pending claims fully patentably distinguish over Stevenson in view of Izaki et al. Since all the prior art rejections of Applicant's claims are based upon Stevenson in view of Izaki et al, and for the foregoing reasons Applicant's claims distinguish over Stevenson in view of Izaki et al, Applicant respectfully submits that Applicant's claims fully patentably distinguish over the prior art. Accordingly, Applicant respectfully requests the Examiner to reconsider and withdraw the rejections under Section 103.

#### **CONCLUSION**

For the foregoing reasons, Applicant respectfully submits that the claims of the above-identified application patentably distinguish over the prior art, and that the application therefore is in condition for allowance. Applicant respectfully requests notice to such effect.

The Commissioner is hereby authorized to charge the additional fee for one additional dependent claim to Deposit Account #18-0988, Docket No. ATOTP0100US.

In the event issues remain in the prosecution of this application, Applicant requests that the Examiner telephone the undersigned attorney to expedite allowance of the

Docket No. ATOTP0100USSerial No. 09/981,587

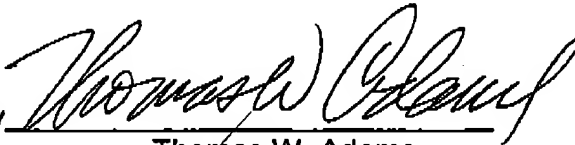
application. Should a Petition for Extension of Time be necessary for the present Reply to the outstanding Office action to be timely filed (or if such a petition has been made and an additional extension is necessary) petition therefor is hereby made and, if any additional fees are required for the filing of this paper, the Commissioner is authorized to charge those fees to Deposit Account #18-0988, Docket No. ATOTP0100US.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, L.L.P.

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By



Thomas W. Adams

✓ Reg. No. 35,047

1621 Euclid Avenue  
Nineteenth Floor  
Cleveland, Ohio 44115  
(216) 621-1113  
(216) 621-6165 (fax)

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